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Response Latencies in a Word Association Test: A New Measuring Method and Its Results

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Recording of response delay to stimuli in a word association task to measure emotionality of the stimulus to the subject goes back to Jung (1910) but is still used quite often (Pollio, 1966). However, the measuring methods and devices have been relatively crude, yielding no better than one second discriminations and involving human intervention in the stimulus presentation and measurement process. The current research sought to assess the results of recording response latencies using a microcomputer for presentation of the stimuli and the precision measurements of the latencies. Comparison was then made as to whether significant differences in response latencies would be found between stimulus words rated by another method as high and low emotional responses, and whether the presence/absence of a human observer would significantly alter the subjects' response latencies.

24 male and 24 female college students responded to 20 stimulus words, determined by previous investigators to be of high and low emotionality through GSR readings. These were randomly mixed in a word association program and presented individually to the subjects by computer; subjects responded by typing responses into the program which timed the response latencies to .01 second, as well as collected the response words themselves. Half the subjects performed with an observer present and watching the screen, and half with the observer having left after setting up the procedure.

ANOVA analysis found the high emotional words to have significantly greater response latencies than low emotional words ($F = 25.19$, $p < .001$ one-tailed), while the presence/absence of observer condition was not significant nor was the interaction. Correlations of word presentation order, word frequency, and response commonality with response latencies all were nonsignificant. Subject latencies were then examined for any "extreme scores", defined as those beyond the .99 confidence level one-tailed based upon the subject's response distribution. These scores were then excluded from the distribution and a new subject mean and SD calculated, this recursion continuing

for the subject until no score remained extreme. The number of scores so identified was then added across subjects for each stimulus word.

A one-way ANOVA was used on these extreme scores per stimulus word to assess whether this method discriminated between high and low emotional words; results were significant ($F(1,18) = 12.08$, $p = 0.003$ one-tailed), with those stimuli classified as highly emotional based on the GSR showing significantly more extreme scores than those classified as low.

TABLE 1. ANALYSIS OF VARIANCE OF THE SUBJECTS' RESPONSE LATENCIES

Source	Sum Sq	DF	Mean Sq	F	P
Main Effects	319334	2	159667	12.740	.000
Presence obs	3596	1	3596	0.287	.592
Word emotion	315738	1	315738	25.194	.000
2-Way Interaction	6131	1	6131	.489	.484 (pres x emot)
Explained	325464	3	108488	8.657	.000
Residual	11980843	956	12532	Total	12306307 959 12832

N	MEAN	S.D.	
High Emot	480	147.6	139.8
Low Emot	480	111.3	74.0

TABLE 2. STIMULUS WORDS, MEAN LATENCY OF RESPONSE, STIMULUS PRESENTATION ORDER, WORD FREQUENCY, RESPONSE COMMONALITY, AND COMPUTED NUMBER OF EXTREME SCORES

WORD	LATENCY	ORDER	FREQ*	COMMONALITY #	EXTREMES
PROUD	235.06	20	50	7	17
DIVORCE	186.02	8	29	6	16
MARRY	171.40	7	18	5	10
<S.NAME>**	161.58	10	-	39	7
FLOWER	138.15	13	23	7	5
AFRAID	136.81	19	57	26	7
DANCE	133.88	16	90	7	6
GLASS	127.00	9	99	13	5
SWIM	119.27	18	15	14	4
LOVE	117.73	6	232	24	5
GIVE	114.33	11	391	29	4
WOMAN	113.10	12	224	35	7
WOUND	112.71	14	28	14	2
BERRY	110.02	2	9	15	2
KISS	107.83	4	17	9	5
CARROT	107.06	1	1	12	2
WHITE	106.79	5	365	29	4
HUNGER	104.13	3	17	12	1
POND	96.63	15	25	16	0
PENCIL	90.04	17	34	34	0

*Word frequency taken from Kucera and Francis (1967)

**Each individual subject was presented with his/her own name as the stimulus word. Frequency data is therefore not applicable: all

calculations using word frequency therefore based on N = 19.

The major finding is that precise timing of response latencies collected by computer can be used to identify high from low emotional words in a population group, yielding an objective, statistical measure of word emotionality for that group.

Low emotional words tended to produce extreme scores for few of the subjects in terms of their own distribution, with the implication that there may be therapeutic implications for those few subjects who did exhibit an extreme scores on one of the low emotional words.

The lack of significance of the presence/absence of observer condition also lends support to those researchers (Koson, et al, 1970; Rezmovic, 1977) who found that subjects responded to a computer no differently than to a human interviewer as opposed to those (Canoune and Leyhe, 1985; McCoullough and Wenck, 1984) who found responses differing between human and computer-mediated collection.(8)

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